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EXAMINER	
COUGHLAN, PETER D	
ART UNIT	**PAPER NUMBER**
2129	

DATE MAILED: 07/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/761,832	ANDERSON ET AL.	
	Examiner	Art Unit	
	Peter Coughlan	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18 and 20-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18 and 20-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *'A'*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

1. This office action is in response to an AMENDMENT entered May 30, 2006 for the patent application 10/761832 filed on January 21, 2004.

2. The First Office Action of March 31, 2006 is fully incorporated into this Final Office Action by reference.

Status of Claims

3 Claims 1-18, 20-24 are pending.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 11, 13, 16, 21 are rejected under 35 U.S.C. 102(e) (hereinafter referred to as **Higuchi**) being anticipated by Higuchi et al., U.S. 6637008.

Claim 1.

Higuchi anticipates determining real costs for a plurality of first value sets represented as a plurality of real chromosomes, wherein the first set of values sets comprise a first plurality of circuit configurations associated with the circuit designs (**Higuchi**, abstract C31:22-32; To employ genetic algorithms there needs to exists two sets of chromosomes. 'Real cost' of applicant is illustrated with an example of 'timing' by Higuchi.); determining speculative costs for a plurality of second value sets represented as a plurality of speculative chromosomes, the speculative chromosomes representing value set variations of the first value sets, wherein the second values sets comprise a second plurality of circuit configurations associated with the circuit design (**Higuchi**, abstract C31:22-32; To employ genetic algorithms there needs to exists two sets of chromosomes. 'Real cost' of applicant is illustrated with an example of 'timing' by Higuchi.); and postponing validation of speculative chromosomes by generating subsequent generations of speculative chromosomes and associated speculative costs from parents selected from at least one of the plurality of real chromosomes and the plurality of speculative chromosomes, until a predetermined validation criteria has been satisfied. (**Higuchi,** C13:8-11; 'Postponing validation' until a 'validation

criteria' of applicant is equivalent to 'continued at least for a predetermined period' of Higuchi.)

Claim 2.

Higuchi anticipates determining real costs for at least one speculative chromosome of the plurality of speculative chromosomes when the predetermined validation criteria has been satisfied, wherein the real cost are determined by a circuit analysis tool and a power/timing estimator. (**Higuchi**, C31:22-32; 'Power/timing estimator' of applicant is equivalent to 'timing of a sample operation' of Higuchi. 'Circuit analysis tool' of applicant is equivalent to 'analyzer 9' of Higuchi.)

Claim 4.

Higuchi anticipates determining real costs comprising executing a real cost function on the plurality of real chromosomes and the determining speculative costs comprising executing an incremental cost function on the plurality of speculative chromosomes, the incremental cost function determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome. (**Higuchi,** C11:32-42, C13:27-40; 'Incremental' of applicant is equivalent to 'adjusting' of Higuchi. 'Cost effect' of applicant is equivalent to 'optimize' of Higuchi. When working with genetic algorithms, one inherently works with parent and speculative chromosomes.)

Claim 11.

Higuchi anticipates executing a real cost function on a plurality of first value sets represented as a plurality of real chromosomes to generate a plurality of real costs for each of the plurality of real chromosomes, wherein the first values sets comprise a plurality of circuit configurations associated with a circuit design and the real cost function comprises as analysis tool and a power/timing estimator for generating real costs as a function of power and timing characteristics of the plurality of circuit configurations (**Higuchi**, abstract C31:22-32; To employ genetic algorithms there needs to exists two sets of chromosomes. 'Real cost' of applicant is illustrated with an example of 'timing' by Higuchi.); executing a genetic algorithm to generate a plurality of speculative chromosomes, the speculative chromosomes representing value set variations of the first value sets (**Higuchi,** C13:27-40; Higuchi illustrates the components of a genetic algorithm.); executing an incremental cost function on the plurality of speculative chromosomes to generate a plurality of speculative costs for each of the plurality of speculative chromosomes; and repeating execution of the genetic algorithm to produce subsequent generations of speculative chromosomes, the incremental cost function determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome (**Higuchi,** C11:32-42, C13:27-40; 'Incremental' of applicant is equivalent to 'adjusting' of Higuchi. 'Cost effect' of applicant is equivalent to

'optimize' of Higuchi. When working with genetic algorithms, one inherently works with parent and speculative chromosomes.); and repeating execution of the incremental cost function on subsequent generations to provide speculative costs for the subsequent generations of speculative chromosomes, until a predetermined validation criteria has been satisfied. (**Higuchi,** C13:8-11; 'Postponing validation' until a 'validation criteria' of applicant is equivalent to 'continued at least for a predetermined period' of Higuchi.)

Claim 13.

Higuchi anticipates validating at least one speculative chromosome of the plurality of speculative chromosomes when the predetermined validation criteria has been satisfied, the validating at least one speculative chromosome comprising executing the real cost function on the at least one speculative chromosome to generate a real cost associated with the at least one speculative chromosome. (**Higuchi,** C15:24-33; 'Validating' of applicant is equivalent to the 'judgment in step S23' of Higuchi.)

Claim 16.

Higuchi anticipates a real cost function that generates real costs for each of a plurality of value sets represented as a plurality of real chromosomes, wherein the real cost function comprises an analysis tool for optimizing a circuit design and a power/timing estimator, and the plurality of value sets being a plurality of circuit configurations generated by the analysis tool (**Higuchi**, abstract

C31:22-32; To employ genetic algorithms there needs to exists two sets of chromosomes. 'Real cost' of applicant is illustrated with an example of 'timing' by Higuchi.); an incremental cost function that generates a plurality of speculative costs corresponding to a plurality of value set variations of at least one of the plurality of real chromosomes, the plurality of value set variations represented as a plurality of speculative chromosomes, the incremental costs function determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome (**Higuchi,** C11:32-42, C13:27-40; 'Incremental' of applicant is equivalent to 'adjusting' of Higuchi. 'Cost effect' of applicant is equivalent to 'optimize' of Higuchi. When working with genetic algorithms, one inherently works with parent and speculative chromosomes.); and a validator that initiates a validation on at least one speculative chromosome upon satisfaction of a predetermined validation criteria, a validation comprising executing the real cost function on the at least one speculative chromosome to generate a real cost associated with at least one speculative chromosome. (**Higuchi,** C15:24-33; 'Validating' of applicant is equivalent to the 'judgment in step S23' of Higuchi.)

Claim 21.

Higuchi anticipates means for determining real costs associated with a plurality of real chromosomes representing different value sets associated with a set of parameters, wherein the values sets comprise a plurality of circuit

configurations associated with the circuit design **(Higuchi,** abstract, C31:22-32; 'Real chromosomes' of applicant is illustrated by 'genetic algorithms' of Higuchi. 'Real cost' of applicant is illustrated with an example of 'timing' by Higuchi.); means for generating a plurality of speculative chromosomes from parent chromosomes selected from at least one of the plurality of speculative chromosomes and the plurality of real chromosomes (**Higuchi,** C13:27-40; Higuchi illustrates the components of a genetic algorithm.); means for determining a speculative cost for a respective speculative chromosome based on a cost of at least one parent chromosome and a cost effect based on a difference in value sets of the at least one parent chromosome and the respective speculative chromosome (**Higuchi,** C11:32-42, C13:27-40; 'Difference in value sets' of applicant is equivalent to 'adjusting' of Higuchi. 'Cost effect' of applicant is equivalent to 'optimize' of Higuchi. When working with genetic algorithms, one inherently works with parent and speculative chromosomes.); and means for postponing validation of the plurality of speculative chromosomes until a predetermined validation criteria has been satisfied. (**Higuchi,** C15:24-33; 'Validating' of applicant is equivalent to the 'judgment in step S23' of Higuchi.)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 6, 7, 9, 10, 15, 20, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higuchi as set forth above, in view of Savitch ('Problem solving with C++', referred to as **Savitch**)

Claim 3.

Higuchi does not teach assigning a speculation count to each generation of speculative chromosomes, the predetermined validation criteria being a specific speculation count.

Savitch teaches assigning a speculation count to each generation of speculative chromosomes, the predetermined validation criteria being a specific speculation count. (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Speculation count to each generation' and 'predetermined validation criteria' of applicant is equivalent to 'time' and 'limit' of Savitch.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to the teachings of Higuchi by using Boolean expressions to determine 'predetermined validation criteria' as taught by Savitch to assigning a speculation count to each generation of speculative chromosomes, the predetermined validation criteria being a specific speculation count.

For the purpose of separating the requirements of validation for later modification if needed.

Claim 6.

Higuchi does not teach the predetermined validation criteria comprises a speculative cost difference between a generation of speculative chromosomes and a subsequent generation of speculative chromosomes exceeding a predetermined cost change limit.

Savitch teaches the predetermined validation criteria comprises a speculative cost difference between a generation of speculative chromosomes and a subsequent generation of speculative chromosomes exceeding a predetermined cost change limit. (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Speculative cost difference between a generation of speculative chromosomes and a subsequent generation' and 'predetermined cost change limit' of applicant is equivalent to 'time' and 'limit' of Savitch.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by using Boolean expressions to determine 'predetermined validation criteria' as taught by Savitch to have the predetermined validation criteria comprises a speculative cost difference between a generation of speculative chromosomes and a subsequent generation of speculative chromosomes exceeding a predetermined cost change limit.

For the purpose of separating the requirements of validation for later modification if needed.

Claim 7.

Higuchi does not teach the predetermined validation criteria comprises a cost difference between a generation of speculative chromosomes and the plurality of real chromosomes exceeding a predetermined cost change limit.

Savitch teaches the predetermined validation criteria comprises a cost difference between a generation of speculative chromosomes and the plurality of real chromosomes exceeding a predetermined cost change limit. (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Cost difference between a generation of speculative chromosomes and the plurality of real chromosomes' and 'predetermined cost change limit' of applicant is equivalent to 'time' and 'limit' of Savitch.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by using Boolean expressions to determine 'predetermined validation criteria' as taught by Savitch to have the predetermined validation criteria comprises a cost difference between a generation of speculative chromosomes and the plurality of real chromosomes exceeding a predetermined cost change limit.

For the purpose of separating the requirements of validation for later modification if needed.

Claim 9.

Higuchi does not teach the predetermined validation criteria comprises speculation errors associated with each generation of speculation exceeding a predetermined limit.

Savitch teaches the predetermined validation criteria comprises speculation errors associated with each generation of speculation exceeding a predetermined limit. (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Speculation errors associated with each generation' and 'a predetermined limit ' of applicant is equivalent to 'time' and 'limit' of Savitch.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by using Boolean expressions to determine 'predetermined validation criteria' as taught by Savitch to have the predetermined validation criteria comprises speculation errors associated with each generation of speculation exceeding a predetermined limit.

For the purpose of separating the requirements of validation for later modification if needed.

Claim 10.

Higuchi does not teach the predetermined validation criteria comprises exceeding an execution time limit for generating subsequent generations of speculative chromosomes and generating speculative costs associated with the subsequent generations.

Savitch teaches the predetermined validation criteria comprises exceeding an execution time limit for generating subsequent generations of speculative

chromosomes and generating speculative costs associated with the subsequent generations. (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Execution time limit' and 'predetermined validation criteria' of applicant is equivalent to 'time' and 'limit' of Savitch.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by using Boolean expressions to determine 'predetermined validation criteria' as taught by Savitch to have the predetermined validation criteria comprises exceeding an execution time limit for generating subsequent generations of speculative chromosomes and generating speculative costs associated with the subsequent generations.

For the purpose of separating the requirements of validation for later modification if needed.

Claim 15.

Higuchi does not teach the predetermined validation criteria is based on at least one of satisfying a speculative chromosome generation count, exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation.

Savitch teaches the predetermined validation criteria is based on at least one of satisfying a speculative chromosome generation count (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Speculation chromosome generation count' and 'predetermined validation criteria' of applicant is equivalent to 'time'

and 'limit' of Savitch.), exceeding a predetermined cost change limit between speculative generations (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Speculative cost difference between a generation of speculative chromosomes and a subsequent generation' and 'predetermined cost change limit' of applicant is equivalent to 'time' and 'limit' of Savitch.) and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation. (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8, p87:1-10; 'Cost difference between a generation of speculative chromosomes and the plurality of real chromosomes' and 'predetermined cost change limit' of applicant is equivalent to 'time' and 'limit' of Savitch.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by using Boolean expressions to determine 'predetermined validation criteria' as taught by Savitch to have teach the predetermined validation criteria is based on at least one of satisfying a speculative chromosome generation count, exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation.

For the purpose of separating the requirements of validation for later modification if needed.

Claim 20.

Higuchi does not teach the predetermined validation criteria is based on at least one of satisfying a speculative chromosome generation count, exceeding a

predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation.

Savitch teaches the predetermined validation criteria is based on at least one of satisfying a speculative chromosome generation count (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Speculation chromosome generation count' and 'predetermined validation criteria' of applicant is equivalent to 'time' and 'limit' of Savitch.), exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation. (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Cost difference between a generation of speculative chromosomes and the plurality of real chromosomes' and 'predetermined cost change limit' of applicant is equivalent to 'time' and 'limit' of Savitch.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by using Boolean expressions to determine 'predetermined validation criteria' as taught by Savitch to the predetermined validation criteria is based on at least one of satisfying a speculative chromosome generation count, exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation.

For the purpose of separating the requirements of validation for later modification if needed.

Claim 23.

Higuchi does not teach the predetermined validation criteria is based on at least one of satisfying a speculative chromosome generation count, exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation.

Savitch teaches the predetermined validation criteria is based on at least one of satisfying a speculative chromosome generation count (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Speculation chromosome generation count' and 'predetermined validation criteria' of applicant is equivalent to 'time' and 'limit' of Savitch.), exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation. (**Savitch,** p65:5-13, p76 Display 2.7, p77 Display 2.8; 'Cost difference between a generation of speculative chromosomes and the plurality of real chromosomes' and 'predetermined cost change limit' of applicant is equivalent to 'time' and 'limit' of Savitch.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by using Boolean expressions to determine 'predetermined validation criteria' as taught by Savitch to have the predetermined validation criteria is based on at least one of satisfying a speculative chromosome generation count, exceeding a predetermined cost change limit between speculative generations and exceeding

a predetermined cost change limit between the plurality of real chromosomes and a speculative generation.

For the purpose of separating the requirements of validation for later modification if needed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5, 12, 14, 17, 18, 22, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higuchi as set forth above, in view of Lee ('U. S. Patent 6181945', referred to as **Lee**)

Claim 5.

Higuchi does not teach assigning a real cost to the plurality of real chromosomes based on the minimum cost real chromosome in the plurality of real chromosomes and assigning a speculation cost to each generation of speculative chromosomes based on the minimum cost speculative chromosome in a respective generation.

Lee teaches assigning a real cost to the plurality of real chromosomes based on the minimum cost real chromosome in the plurality of real chromosomes and assigning a speculation cost to each generation of speculative chromosomes based on the minimum cost speculative chromosome in a respective generation. (**Lee,** C10:62 through C11:50; In the 'fifth step' the highest costs are replaced with the children. Resulting with Lee converging to a minimum cost goal.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by assigning a cost to existing chromosomes so that speculative chromosomes have a cost based on existing chroosomes as taught by Lee to have a real cost to the plurality of real chromosomes based on the minimum cost real chromosome in the plurality of real chromosomes and assigning a speculation cost to each generation of speculative chromosomes based on the minimum cost speculative chromosome in a respective generation.

For the purpose of having speculative costs reflect current costs of existing chromosomes.

Claim 12.

Higuchi does not teach generating the incremental cost function based on at least one real chromosome and associated real cost.

Lee teaches generating the incremental cost function based on at least one real chromosome and associated real cost. (**Lee,** C9:66 through C10:15; Lee

'cost has to do with the actual cost of paging plans.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by making small alterations with the chromosome and testing the result as taught by Lee to generate the incremental cost function based on at least one real chromosome and associated real cost.

For the purpose of find a better solution for a given situation.

Claim 14.

Higuchi does not teach repeating the execution of the genetic algorithm to generate a plurality of new speculative chromosomes from the at least one validated speculative chromosome, and executing a new incremental cost function on the plurality of new speculative chromosomes to generate a plurality of speculative costs for each of the plurality of new speculative chromosomes.

Lee teaches repeating the execution of the genetic algorithm to generate a plurality of new speculative chromosomes from the at least one validated speculative chromosome (**Lee,** C11:37-41), and executing a new incremental cost function on the plurality of new speculative chromosomes to generate a plurality of speculative costs for each of the plurality of new speculative chromosomes. (**Lee,** C11:21-31) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by testing the speculative chromosome in terms of cost as taught by

Lee to repeat the execution of the genetic algorithm to generate a plurality of new speculative chromosomes from the at least one validated speculative chromosome, and executing a new incremental cost function on the plurality of new speculative chromosomes to generate a plurality of speculative costs for each of the plurality of new speculative chromosomes.

For the purpose of finding a better solution for a lower cost then the current chromosome.

Claim 17.

Higuchi does not teach a genetic algorithm that generates the plurality of speculative chromosomes from parent chromosomes selected from the real chromosomes.

Lee teaches a genetic algorithm that generates the plurality of speculative chromosomes from parent chromosomes selected from the real chromosomes. (**Lee,** C11:21-31) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by using crossover and mutation as processes for altering an existing chromosome into new speculative chromosomes as taught by Lee to have the genetic algorithm generates at least one subsequent generation of speculative chromosomes employing parents chromosomes selected from at least one of real chromosomes and speculative chromosomes.

For the purpose of the generation of new chromosomes from existing patterns allow for small increments towards the final goal instead of randomly falling within the range of possible solutions.

Claim 18.

Higuchi does not teach the genetic algorithm generates at least one subsequent generation of speculative chromosomes employing parents chromosomes selected from at least one of real chromosomes and speculative chromosomes.

Lee teaches the genetic algorithm generates at least one subsequent generation of speculative chromosomes employing parents chromosomes selected from at least one of real chromosomes and speculative chromosomes. (**Lee,** C11:21-41; When the speculative chromosome is validated and replace two other 'plans' they are called real, but at one point they were speculative chromosomes. After the first iteration there are now at least two 'speculative chromosomes' in the plan. At one point an 'original' real chromosome and a speculative 'created' chromosome will be used together to generate a new speculative chromosome.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by forming a new speculative chromosome by following standard genetic algorithm rules as taught by Lee to have the genetic algorithm generates at least one subsequent generation of speculative chromosomes employing

parents chromosomes selected from at least one of real chromosomes and speculative chromosomes.

For the purpose of making small alterations within the chromosome to find a better solution for the problem at hand.

Claim 22.

Higuchi does not teach the means for generating speculative chromosomes being operative to generate additional generations of speculative chromosomes from parents selected from the at least one of the plurality of speculative chromosomes and the plurality of real chromosomes.

Lee teaches the means for generating speculative chromosomes being operative to generate additional generations of speculative chromosomes from parents selected from the at least one of the plurality of speculative chromosomes and the plurality of real chromosomes. (**Lee,** C11:21-41; When the speculative chromosome is validated and replace two other 'plans' they are called real, but at one point they were speculative chromosomes. After the first iteration there are now at least two 'speculative chromosomes' in the plan. At one point an 'original' real chromosome and a speculative 'created' chromosome will be used together to generate a new speculative chromosome.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by generating speculative chromosomes by following the process of a genetic algorithm as taught by Lee to

have the means for generating speculative chromosomes being operative to generate additional generations of speculative chromosomes from parents selected from the at least one of the plurality of speculative chromosomes and the plurality of real chromosomes.

For the purpose of altering the chromosomes and testing after each iteration to optimize the chromosome for a solution.

Claim 24.

Higuchi does not teach validation of the plurality of speculative chromosomes comprising executing the means for determining a real cost on at least one speculative chromosome.

Lee teaches validation of the plurality of speculative chromosomes comprising executing the means for determining a real cost on at least one speculative chromosome. (**Lee,** C11:32-36; 'Validation' of applicant is equivalent to 'replaced' by Lee.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by testing new chromosomes to existing chromosomes as taught by Lee to validate of the plurality of speculative chromosomes comprising executing the means for determining a real cost on at least one speculative chromosome.

For the purpose of iterating the genetic algorithm to find an optimized solution.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Higuchi as set forth above, in view of Choo ('U. S. Patent Publication 20040001021', referred to as **Choo**)

Claim 8.

Higuchi does not teach the predetermined validation criteria comprises speculative costs converging for subsequent generations of speculative chromosomes.

Choo teaches the predetermined validation criteria comprises speculative costs converging for subsequent generations of speculative chromosomes. (**Choo,** ¶0063) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Higuchi by utilizing the concept of convergence as taught by Choo to have the

predetermined validation criteria comprises speculative costs converging for subsequent generations of speculative chromosomes.

For the purpose of taking into account that a genetic algorithm will most likely never reach an optimum value but will only approach it.

Response to Arguments

5. Applicant's arguments filed on May 30, 2006 for claims 1-18, 20-24 have been fully considered but are not persuasive.

6. In reference to the Applicant's argument:

Claims 1-18 and 20-24 stand rejected under 35 U.S.C. §101 for nonstatutory subject matter. Claims 1, 11, 16 and 21 have been amended to overcome this rejection. Withdrawal of this rejection is requested for at least the following reasons.

Claim 1 has been amended to recite a method for optimizing circuit design, wherein first value sets comprise a first plurality of circuit configurations associated with a circuit design and wherein a second valued sets comprise a second plurality of circuit configurations associated with the circuit design. It is respectfully submitted that amended claim 1 recites elements of a substantial practical application of optimizing a circuit design. Thus amended claim 1 has a useful, tangible and concrete final result. Therefore, it is respectfully submitted that amended claim 1 is no longer rejectable under 35 U.S.C. §101.

Amended claim 11 recites that the first values sets comprise a plurality of circuit configurations associated with a circuit design and the real cost function comprises an analysis tool and a power/timing estimator for generating real costs as a function of power and timing characteristics. Similarly to claim 1, amended claim 11 recites elements of a substantial practical application. Therefore, it is respectfully submitted that amended claim 11 is no longer rejectable under 35 U.S.C. §101.

Claim 16 has been amended to incorporate the subject matter recited in claim 19. Amended claim 16 recites that a real cost function comprises an analysis tool for optimizing a circuit design, and a plurality of value sets being a plurality of circuit configurations generated by the analysis tool. Similarly to claim 1, amended claim 16 recites elements of a substantial practical application. Therefore, it is respectfully submitted that amended claim 16 is no longer rejectable under 35 U.S.C. §101.

Amended claim 21 recites a system for minimizing a cost associated with a circuit design, wherein value sets comprise a plurality of circuit configurations associated with the circuit design. Similarly to claim 1, amended claim 21 recites elements of a substantial practical application. Therefore, it is respectfully submitted that amended claim 21 is no longer rejectable under 35 U.S.C. §10l.

Claims 2-10, 12-15, 17-18 and 20, and 22-24, depend either directly or indirectly from amended claims 1, 11, 16, and 21, respectively, and recite statutory subject matter for at least the same reasons as stated above for their respective bases claims, and for the specific elements recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 1-18 and 20-24 under 35 U.S.C. §101 is respectfully requested.

Examiner's response:

Examiner withdraws the 35 U.S.C. §101 rejection.

7. In reference to the Applicant's argument:

Claims 1, 2, 4, 5, 11, 13, 14, 16, 17, 18, 21, 22 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,181,945 to Lee ("Lee") in view of 'Structured Programming', by Dahl ("Dahl"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Independent claim I has been amended to recite a method for optimizing a circuit design comprising determining real costs for a plurality of first value sets represented as a plurality of real chromosomes, wherein the first values sets comprise a first plurality of circuit configurations associated with the circuit design, determining speculative costs for a plurality of second value sets represented as a plurality of speculative chromosomes, the speculative chromosomes representing value set variations of the first value sets, wherein the second values sets comprise a second plurality of circuit configurations associated with the circuit design and postponing validation of speculative chromosomes by generating subsequent generations of speculative

chromosomes and associated speculative costs from parents selected from at least one of the plurality of real chromosomes and the plurality of speculative chromosomes, until a predetermined validation criteria has been satisfied.

Real costs are defined in the specification as costs associated with a value set that are generated by a basis cost function, and speculative costs are defined in the specification as an approximate cost that would be generated by the basis cost function. The employment of speculative costs facilitates convergence of a desired solution by trading speed for accuracy. (See p. 3, 1. 32 - p. 4, 1. 6 of the present application).

Lee discloses selecting two zone paging plans having the lowest paging costs, and subjecting the two zone paging plans to a genetic operation to produce two children paging plans. Lee discloses that paging costs for two children paging plans are calculated (See Lee, Col. 11, Lines 24-26). Lee discloses one methodology for computing costs based on an Equation illustrated in Col. 5, lines 5-32 in Lee, and therefore one cost function. Lee discloses that the higher the probability terms in the Equation illustrated in Col. 5, lines 5-32, the less the paging cost. Lee then discloses replacing the two highest cost paging plans with the two children paging plans (See Lee, Col. 11, Lines 35-36).

Lee does not teach or suggest determining real costs for a plurality of first value sets represented as a plurality of real chromosomes, wherein the first values sets comprise a first plurality of circuit configurations associated with the circuit design, determining speculative costs for a plurality of second value sets represented as a plurality of speculative chromosomes, the speculative chromosomes representing value set variations of the first value sets, wherein the second values sets comprise a second plurality of circuit configurations associated with the circuit design, as recited in amended claim 1.

Nothing in Lee teaches or suggests that the paging costs for parent chromosomes are real costs and the paging costs for children chromosomes are speculative costs. Accordingly, Lee does not teach or suggest determining speculative costs for a plurality of second value sets represented as a plurality of speculative chromosomes, the speculative chromosomes representing value set variations of the first value sets, as recited in amended claim 1.

Applicant agrees that Lee does not teach or suggest postponing validation of speculative chromosomes by generating subsequent generations of speculative chromosomes and associated speculative costs from parents selected from at least one of plurality of real chromosomes and the plurality of speculative chromosomes, until a predetermined validation criteria has been satisfied, as recited in amended claim 1. However, in contrast to the contention of the Office Action, Dahl does not cure the deficiencies of Lee.

Dahl discloses a simple WHILE-DO loop (See Dahl, Page 19). Dahl does not disclose any method that could be construed as postponing validation of speculative chromosomes by generating subsequent generations of speculative chromosomes and associated speculative costs from parents selected from at least one of plurality of real chromosomes and the plurality of speculative chromosomes, until a predetermined validation criteria has been satisfied, as recited in amended claim 1. The WHILE-DO loop disclosed in Dahl checks for a condition, executes one or more instructions and checks for the condition again, and when the condition is met, the WHILE-DO loop is exited (See Dahl, Page 19). Dahl is completely devoid of generating subsequent generations of speculative chromosomes and associated speculative costs, until a predetermined validation criteria has been satisfied. In fact, Dahl does not teach or suggest any specific instruction that could be executed in the WHILE-DO loop. Accordingly, Dahl fails to makeup for the aforementioned deficiencies of Lee as suggested by the Examiner.

Furthermore, Applicant's represenative respectfully submits that there is no motivation to combine and modify Lee and Dahl to provide the elements recited in amended claim 1. The fact that a prior art reference could be modified so as to produce the claimed device is not a basis for obviousness unless the prior art suggested the desirability of such a modification . *In re Gordon,* 733 F.2d 900, 901, 221 U.S.P.Q. 1125 (Fed. Cir. 1984). As mentioned above, Lee does not teach or suggest real costs for real chromosomes and speculative costs for speculative chromosomes. Lee discloses only one cost, namely, paging costs. It is respectfully submitted that the Examiner has not set forth any reason to modify Lee to include any kind of second cost.

Additionally, without teaching or suggesting speculative chromosomes and speculative costs, it is respectfully submitted that there would be no need to postpone validation of speculative chromosomes, as recited in claim 1. Since Lee does not teach or suggest two different costs, and the paging costs disclosed in Lee are calculated for both parent and children paging plans, there would be no need to postpone any calculation of costs of any kind. Dahl does not teach or suggest anything that relates to genetic algorithms. Additionally, Dahl also fails to teach or suggest the desirability of postponing validation of speculative chromosomes, as recited in claim 1. Accordingly, Dahl does not provide any teaching or suggestion that would provide the desirability to modify the teachings of Lee and Dahl in the manner suggested by the Office Action.

Further still, the Federal Circuit has held that in order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method. *Beckman Instruments, Inc. v LKB Produkter AB, 892* F.2d 1547, 1551, 13 U.S.P.Q.2d, 1301 (Fed. Cir. 1989). The combination of Lee and Dhal is completely devoid of any method for postponing validation of speculative chromosomes. Thus, the combination of Lee and Dahl

does not enable one skilled in the art to postpone validation of speculative chromosomes by generating subsequent generations of speculative chromosomes and associated speculative costs from parents selected from at least one of a plurality of real chromosomes and a plurality of speculative chromosomes, until a predetermined validation criteria has been satisfied. Thus, it is respectfully submitted that the Examiner has not shown why or how one of ordinary skill in the art would combine and modify the teachings of Lee and Dahl in the manner suggested by the Office Action. Therefore, Lee and Dahl do not make claim 1 obvious. Accordingly, claim I should be patentable over the cited art.

Examiner's response:

Higuchi is a genetic algorithm that is used to design circuits. Cost of Higuchi is timing which parallels applicant. Higuchi uses genetic algorithm which inherently has chromosomes and follows all standard methods that are associated with genetic algorithms. Huguchi states postponing validation for a predetermined criteria (time).

8. In reference to the Applicant's argument:

Claims 2, 4 and 5 depend from amended claim 1. Claims 2, 4 and 5 should be patentable over the cited art for at least the same reasons as amended claim 1 and for the specific elements recited therein.

Additionally, claim 2 recites determining real costs for at least one speculative chromosome of a plurality of speculative chromosomes when a predetermined validation criteria has been satisfied. Claim 2 further illustrates the difference between real costs and speculative costs. That is, when claim 2 is read with claim 1, both the real costs and the speculative costs are calculated for at least one speculative chromosome. As stated above, Lee only discloses one cost function. In Lee, there would not be a need to calculate paging costs twice for any paging zone using the same function. Thus, Lee and Dahl, taken individually or in combination, do not teach or suggest each and every element of claim 2.

Examiner's response:

Higuchi uses timing as a cost. Higuchi determines speculative costs by using a 'analyzer 9' to evaluate real costs of a speculative chromosome.

9. In reference to the Applicant's argument:

Amended claim 4 further recites determining real costs comprising executing a real cost function on the plurality of real chromosomes and the determining speculative costs comprising executing an incremental cost function on the plurality of speculative chromosomes, the incremental cost function determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome. Lee discloses only one paging cost function, and thus does not disclose an incremental cost function that approximates a cost effect of an incremental change in a value set, as recited in claim 4. Thus, Lee and Dahl, taken individually or in combination, do not teach or suggest each and every element of claim 4.

Examiner's response:

Higuchi illustrates analyzing a plurality of chromosomes by 'adjusting' the chromosomes. Each speculative chromosome is generated by parent chromosomes.

10. In reference to the Applicant's argument:

Furthermore, claim 5 recites assigning a real cost to a plurality of real chromosomes based on the minimum cost real chromosome in a plurality of real chromosomes and assigning a speculation cost to each generation of speculative chromosomes based on the minimum cost speculative chromosome in a respective generation. Lee discloses determining a paging cost of each zone paging plan (See Lee, Col. 11, Lines 19-20). Lee also discloses replacing two highest paging cost plans by two children paging plans (See Lee, Col. 11, Lines 35-36). Lee is silent on assigning any plurality of paging plans a cost other

than the calculated paging cost for each plan. That is, Lee does not teach or suggest assigning a real cost to a plurality of real chromosomes based on the minimum cost real chromosome in a plurality of real chromosomes and assigning a speculation cost to each generation of speculative chromosomes based on the minimum cost speculative chromosome in a respective generation, as recited in claim 5. Thus, Lee and Dahl taken individually or in combination, do not teach or suggest each and every element of claim 5.

Examiner's response:

'Two children' of Lee is equivalent to 'plurality' of applicant. Real cost of parents is illustrated in C11:62-67. Cost of the children in illustrated in C11:21-36. The 'cost' of both of these is the same definition of cost.

11. In reference to the Applicant's argument:

Amended independent claim 11 recites executing two different cost functions, namely, a real cost function and an incremental cost function. Amended claim 11 further recites that the incremental cost function determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome.

As stated above with respect to amended claim 1, Lee discloses only one paging cost function. Thus, Lee does not teach or suggest executing an incremental cost function on a plurality of speculative chromosomes to generate a plurality of speculative costs for each of a plurality of speculative chromosomes, the incremental cost function determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome, as recited in amended claim 11.

Lee also does not teach or suggest repeating execution of a genetic algorithm to produce subsequent generations of speculative chromosomes and repeating execution of an incremental cost function on subsequent generations to provide speculative costs for the subsequent generations of speculative chromosomes, until a predetermined validation criteria has been satisfied, as recited in amended claim 11. As stated above, Lee does not teach or suggest an

incremental cost function. Therefore, Lee cannot teach or suggest repeating execution of an incremental cost function, as recited in amended claim 11. The addition of Dahl does not cure the aforementioned deficiencies of Lee. Dahl also does not teach or suggest two different costs functions. Dahl does not teach or suggest executing any type of cost function. Accordingly, Lee and Dahl, taken individually or in combination do not teach or suggest each and every element of claim 11.

Examiner's response:

The incremental cost function of applicant is equivalent to the adjustment and analysis by 'analyzer 9' of Higuchi. 'Cost' function of applicant is equivalent to 'time' of Higuchi. Huguchi states postponing validation for a predetermined criteria (time), thus iteration is repeated.

12. In reference to the Applicant's argument:

Claims 13 and 14 depend either directly or indirectly from amended claim 11 and should be patentable over the cited art for at least the same reasons as amended claim 11 and for the specific elements recited therein.

Additionally, claim 12 recites generating an incremental cost function based on at least one real chromosome and associated real cost. Claim 12 further illustrates the difference between the real cost function recited in amended claim 11, from which claim 12 depends, and the incremental cost function recited in claim 11. As stated above, none of the cited art teaches or suggests two different cost functions. Accordingly, Lee and Dahl, taken individually or in combination do not teach or suggest each and every element of claim 12.

Examiner's response:

Real cost of parents is illustrated in C11:62-67. Cost of the children in illustrated in C11:21-36. Therefore the cost function of the child is one function and the cost of the parent is the second function.

13. In reference to the Applicant's argument:

Furthermore, claim 13 recites validating at least one speculative chromosome of a plurality of speculative chromosomes when a predetermined validation criteria has been satisfied, the validating at least one speculative chromosome comprising executing a real cost function on the at least one speculative chromosome to generate a real cost associated with the at least one speculative chromosome. The Office Action contends that "validating" as recited in claim 13 is equivalent to "replaced," as disclosed by Lee (See Office Action, Page 8). Applicant respectfully disagrees. Lee discloses that two highest paging cost plans are replaced by two children paging plans (See Lee, Col. 11, Lines 35-36). Claim 13 recites that validating at least one speculative chromosome comprises executing a real cost function on at least one speculative chromosome to generate a real cost associated with the at least one speculative chromosome. There is no teaching or suggestion in Lee that the "replacing" process comprises validating by executing a real cost function, as recited in claim 13. Thus, Lee and Dahl do not teach or suggest each and every element of claim 13.

Examiner's response:

Huguchi states postponing validation for a predetermined criteria, for as long the increasing rate is below a threshold. 'Validating' of applicant is equivalent to the 'judgment in step S23' of Higuchi.

14. In reference to the Applicant's argument:

Amended independent claim 16 recites two cost functions, namely, a real cost function and an incremental cost function. Amended claim 16 further recites that the incremental cost function determines a speculative cost by approximating a

cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome. As stated above with respect to amended claim 1, Lee only discloses a single paging cost function. Accordingly, Lee does not teach or suggest an incremental cost function that generates a plurality of speculative costs corresponding to a plurality of value set variations of at least one of a plurality of real chromosomes and determines a speculative cost by approximating a cost effect of an incremental change in a value set of a speculative chromosome relative to a parent chromosome and a cost associated with the parent chromosome, as recited in amended claim 16.

The addition of Dahl does not cure the aforementioned deficiencies of Lee. Contrary to the assertion by the Examiner, Dahl does not teach or suggest a validator that initiates validation on at least one speculative chromosome upon satisfaction of a predetermined validation criteria, a validation comprising executing a real cost function on at least one speculative chromosome to generate a real cost associated with the at least one speculative chromosome. In amended claim 16, speculative costs and real costs are generated for at least one speculative chromosome. In Lee, a single paging cost is determined for each paging plan. In Dahl, no costs of any kind are generated. Accordingly, taken individually or in combination, Lee and Dahl fail to teach or suggest each and every element of amended claim 16.

Examiner's response:

The incremental cost function of applicant is equivalent to the adjustment and analysis by 'analyzer 9' of Higuchi. 'Cost' function of applicant is equivalent to 'time' of Higuchi. 'Validating' of applicant is equivalent to the 'judgment in step S23' of Higuchi.

15. In reference to the Applicant's argument:

Claims 17-18 depend either directly or indirectly from amended claim 16 and are patentable over the cited art for at least the same reasons as amended claim 16 and for the specific elements recited therein. Accordingly, claims 17-18 should be patentable over the cited art.

Examiner's response:

No argument was made.

16. In reference to the Applicant's argument:

Amended independent claim 21 recites means for determining real costs and means for determining speculative costs. As discussed above with respect to amended claim 1, Lee discloses only paging costs. Additionally, claim 21 recites that means for determining a speculative cost for a respective speculative chromosome based on a cost of at least one parent chromosome and a cost effect based on a difference in value sets of the at least one parent chromosome and the respective speculative chromosome. Lee does not teach or suggest means for determining a speculative cost for a respective speculative chromosome based on a cost of at least one parent chromosome and a cost effect based on a difference in value sets of the at least one parent chromosome and the respective speculative chromosome, as recited in amended claim 21. Dahl does not cure the deficiencies of Lee with respect to determining real and speculative costs.

Furthermore, contrary to the Examiner's assertion in the office action, Dahl does not teach or suggest a means for postponing validation of a plurality of speculative chromosomes until a predetermined validation criteria has been satisfied, as recited in amended claim 21, since Dahl does not teach or suggest anything that corresponds to validation of a plurality of speculative chromosomes. As stated above with respect to claim 1, there is no motivation to combine and modify the teachings of Lee and Dahl in the manner suggested by the Office Action.

Examiner's response:

'Real cost' of applicant is illustrated with an example of 'timing' by Higuchi. When working with genetic algorithms, one inherently works with parent and speculative(children) chromosomes. The cost of speculative chromosomes is speculative cost. 'Validating' of applicant is equivalent to the 'judgment in step S23' of Higuchi.

17. In reference to the Applicant's argument:

Claims 22 and 24 depend from amended claim 21 and should be patentable over the cited art for at least the same reasons as amended claim 21 and for the specific elements recited therein. Accordingly, claims 22 and 24 should be patentable over the cited art.

Examiner's response:

No argument was made.

18. In reference to the Applicant's argument:

Claim 24 further recites validation of a plurality of speculative chromosomes comprising executing means for determining a real cost on at least one speculative chromosome. Since claim 24 depends from amended claim 21, the real cost and the speculative cost is determined for at least one speculative chromosomes. Lee does not teach or suggest determining two different costs for a speculative chromosome. Thus, Lee in view of Dahl does not teach or suggest each and every element of claim 24.

Examiner's response:

'Validating' of applicant is equivalent to the 'judgment in step S23' of Higuchi.

19. In reference to the Applicant's argument:

Claims 3, 6, 7, 9, 10, 15, 20 and 23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Lee and Dahl, as set forth above, and further in view of 'Problem Solving With C++' by Savitch ("Savitch"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

The addition of Savitch does not cure the aforementioned deficiencies of Lee and Dahl with respect to claims 1, 11, 16 and 21, as stated above. Claims 3, 6, 7, 9 and 10, 15, 20 and 23 depend either directly or indirectly from amended claims 1, 11, 16 and 21, respectively. Accordingly, claims 3, 6, 7, 9 and 10, 15, 20 and 23 should be patentable over the cited art.
Savitch discloses basic C++ operators, including the '>` operator (the greater than operator). The Examiner states that it would be obvious to combine the C++ Boolean expressions taught in Savitch to the teaching of Lee and Dahl to make obvious each of the applicant's specific claims to the predetermined validation criteria. Applicant respectfully disagrees with the Examiner's blanket rejection of each the applicant's specific claims to the predetermined validation criteria.

The Examiner has not stated any motivation or suggestion or manner of modifying the Boolean expressions taught by Savitch to provide the elements of the specific claims to the predetermined validation criteria recited in 3, 6, 7, 9-10, 15, 20 and 23. As stated above, the fact that a prior art reference could be modified so as to produce the claimed device is not a basis for obviousness unless the prior art suggested the desirability of such a modification . *In re Gordon,* 733 F.2d 900, 901, 221 U.S.P.Q. 1125. It is respectfully submitted that the Examiner has not set forth any reason as to why it would be desirable to implement the particular predetermined validation criteria recited in claims 3, 6, 7, 9-10, 15, 20 and 23. Additionally, as stated above, the Federal Circuit has held that in order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method. *Beckman Instruments, Inc. v LKB Produkter AB,* 892 F.2d 1547, 1551, 13 U.S.P.Q.2d, 1301. It is respectfully submitted the combination of Lee, Dahl and Savitch would not enable one skilled in the art to make the claimed invention of claims 3, 6, 7, 9-10, 15, 20 and 23, since none of the cited art discloses anything that could be construed as the predetermined validation criteria recited in claims 3, 6, 7, 9-10, 20 and 23. Thus, the combination of Lee, Dahl and Savitch does not make claim 3, 6, 7, 9-10, 20 and 23 obvious.

Specifically, Savitch does not teach or suggest assigning a speculation count to each generation of speculative chromosomes, a predetermined validation criteria being a specific speculation count, as recited in claim 3. Thus, taken individually or in combination, Lee, Dahl, and Savitch do not teach or suggest each and every element of claim 3.

Examiner's response:

Applicant's invention is the use of genetic algorithms for circuit design. Higuchi is the use of genetic algorithms for circuit designs. Claim 3 is nothing more than numerical manipulations that are based on Higuchi. Claim 3 is Boolean flag that is tripped when a count reaches a given 'count'.

20. In reference to the Applicant's argument:

Savitch does not teach or suggest that predetermined validation criteria comprises a speculative cost difference between a generation of speculative chromosomes and a plurality of real chromosomes, as recited in claim 6. Thus, taken individually or in combination, Lee, Dahl and Savitch do not teach or suggest each and every element of claim 6.

Examiner's response:

Applicant's invention is the use of genetic algorithms for circuit design. Higuchi is the use of genetic algorithms for circuit designs. Claim 6 is nothing more than numerical manipulations that are based on Higuchi. The Boolean expression is a less than '<'. This would be used in the difference between speculative and real chromosomes.

21. In reference to the Applicant's argument:

Savitch does not teach or suggest that predetermined validation criteria comprises a cost difference between a generation of speculative chromosomes and a plurality of real chromosomes exceeding a predetermined cost change limit, as recited in claim 7. Thus, taken individually or in combination, Lee, Dahl, and Savitch do not teach or suggest each and every element of claim 7.

Examiner's response:

Applicant's invention is the use of genetic algorithms for circuit design. Higuchi is the use of genetic algorithms for circuit designs. Claim 7 is nothing more than numerical manipulations that are based on Higuchi. The Boolean expression is a less than '<'. This would be used in the difference between speculative and real chromosomes. Depending on the results of the Boolean expression determines if the Boolean expression flag is changed.

22. In reference to the Applicant's argument:

Savitch does not teach or suggest a predetermined validation criteria comprises speculation errors associated with each generation of speculation exceeding a predetermined limit, as recited in claim 9. Thus, taken individually or in combination, Lee, Dahl and Savitch do not teach or suggest each and every element of claim 9.

Examiner's response:

Applicant's invention is the use of genetic algorithms for circuit design. Higuchi is the use of genetic algorithms for circuit designs. Claim 7 is nothing more than numerical manipulations that are based on Higuchi. The count does not depend on if the speculation was an 'error', only that one occurred. The Boolean expression is a less than '<'. This would be used in the difference between speculative and real chromosomes. Depending on the results of the Boolean expression determines if the Boolean expression flag is changed.

23. In reference to the Applicant's argument:

Savitch does not teach or suggest a predetermined criteria comprises exceeding an execution time limit for generating subsequent generations of speculative chromosomes and generating speculative costs associated with the subsequent generation, as recited in claim 10. Thus, taken individually or in combination, Lee, Dahl and Savitch do not teach or suggest each and every element of claim 10.

Examiner's response:

Applicant's invention is the use of genetic algorithms for circuit design. Higuchi is the use of genetic algorithms for circuit designs. Claim 10 is nothing more than numerical manipulations that are based on Higuchi. The predetermined limit of applicant is equivalent to 'time' in the comparison operators example. This with an 'if-else' statement fulfills the applicant requirement.

24. In reference to the Applicant's argument:

Savitch does not teach or suggest that validation criteria is based on satisfying at least one of a speculative chromosome generation count, exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between a plurality of real chromosomes and a speculative generation, as recited in claim 15. Thus, taken individually or in combination, Lee, Dahl and Savitch do not teach or suggest each and every element of claim 15.

Examiner's response:

Applicant's invention is the use of genetic algorithms for circuit design. Higuchi is the use of genetic algorithms for circuit designs. Claim 15 is nothing more than numerical manipulations that are based on Higuchi. 'Satisfying a generation count' is nothing more than a Boolean expression using a counter (incrementor) as a trip.

25. In reference to the Applicant's argument:

Savitch does not teach or suggest that validation criteria is based on at least one of satisfying a speculative chromosome generation count, exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes and a speculative generation, as recited in claim 20. Thus, taken individually or in combination, Lee, Dahl and Savitch do not teach or suggest each and every element of claim 20.

Examiner's response:

Applicant's invention is the use of genetic algorithms for circuit design. Higuchi is the use of genetic algorithms for circuit designs. Claim 20 is nothing more than numerical manipulations that are based on Higuchi. If the Boolean expression is 'true' then the 'if' portion of the 'if-else' statement follows.

26. In reference to the Applicant's argument:

Savitch does not teach or suggest that validation criteria is based on at least one of satisfying a speculative chromosome generation count, exceeding a predetermined cost change limit between speculative generations and exceeding a predetermined cost change limit between the plurality of real chromosomes

and a speculative generation, as recited in claim 23. Thus, taken individually or in combination, Lee, Dahl and Savitch do not teach or suggest each and every element of claim 23.

Examiner's response:

Applicant's invention is the use of genetic algorithms for circuit design. Higuchi is the use of genetic algorithms for circuit designs. Claim 23 is nothing more than numerical manipulations that are based on Higuchi. If the Boolean expression is 'true' or 'satisfied' then the 'if' portion of the 'if-else' statement follows. The code under the 'if' statement would be the Boolean expression being changed(tripped) as a flag.

27. In reference to the Applicant's argument:

Choo does not makeup for the aforementioned deficiencies of Lee and Dahl with respect to claim 1, which claim 8 depends. Specifically, Lee and Dahl, do not teach or suggest determining real costs for a plurality of first value sets represented as a plurality of real chromosomes, wherein the first values sets comprise a first plurality of circuit configurations associated with the circuit design, determining speculative costs for a plurality of second value sets represented as a plurality of speculative chromosomes, the speculative chromosomes representing value set variations of the first value sets, wherein the second values sets comprise a second plurality of circuit configurations associated with the circuit design, as recited in claim 1.

Furthermore, Lee and Dahl, do not teach or suggest any method that could be construed as postponing validation of speculative chromosomes by generating subsequent generations of speculative chromosomes and associated speculative costs from parents selected from at least one of plurality of real chromosomes and the plurality of speculative chromosomes, until a predetermined validation criteria has been satisfied, as recited in amended claim 1. Additionally, claim 8 recites that the predetermined validation criteria comprises speculative costs converging for subsequent generations of speculative chromosomes.

Choo discloses that evaluating a cost function (step 104 of FIG. 1 of Choo) may include a convergence check (See Choo, Para. [0063]). However, similarly to Lee, Choo discloses only one cost function. In contrast, in claim 8, the validation criteria comprises speculative costs converging as opposed to real costs converging. Nothing in Choo teaches or suggests that the cost function disclosed could calculate speculative costs. Accordingly, Choo does not teach or suggest that validation criteria comprises speculative costs converging for subsequent generations of speculative chromosomes, as recited in claim 8. Thus, taken individually or in combination, Lee, Dahl and Choo do not teach or suggest each and every element of claim 8. Therefore, Lee, Dahl and Choo do not make claim 8 obvious.

For the reasons described above, claim 8 should be patentable over the cited art. Accordingly, withdrawal of this rejection is respectfully requested.

Examiner's response:

Choo does not disclose what is used as input to determine convergence. Applicant claims that convergence of speculation costs is analyzed. This is only a point of reference. The convergence check of real cost is an iteration away from being a convergence check of speculation and visa versa. Since speculation is a precursor of real and visa versa, there is no difference.

Examination Considerations

28. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP

p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has the full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

29. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and sprit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but link to prior art that one of ordinary skill in the art would find inherently appropriate.

30. Examiner's Opinion: Paragraphs 28 and 29 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

Conclusion

31. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

32. Claims 1-18, 20-24 are rejected.

Correspondence Information

33. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner Peter Coughlan, whose telephone number is (571) 272-5990. The Examiner can be reached on Monday through Friday from 7:15 a.m. to 3:45 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor David Vincent can be reached at (571) 272-3687. Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

Hand delivered to:

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Customer Service Window,

Randolph Building,

401 Dulany Street,

Alexandria, Virginia 22313,

(located on the first floor of the south side of the Randolph Building);

or faxed to:

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Peter Coughlan

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